

future. Whereas the *Mercury*, *Gemini* and *Apollo* programmes were politically motivated, the reasons to return are more practical. Jim Garvin, chief scientist at NASA's Goddard Space Flight Center in Greenbelt, Maryland, gives the most succinct reason: "Going to the Moon enables us to build a platform for technology that is transformational to our society, and that's not just Teflon."

As Carroll's interviews with experts show, those of us who remain on Earth will probably reap the benefits from innovations that emerge from the new Moon programme. These include advances in communications, materials science, computer technology, robotics, medical procedures and even building materials.

There are also purely scientific reasons for returning to the Moon. It is, as Carroll writes, "the Rosetta stone of the terrestrial planets", and there is still much to be learned about its geology and origins. If ice is locked up in the permanently shadowed regolith at the north or south poles, as many scientists think, it probably got there via countless impacting comets. Such material would be pristine, deposited when the Solar System was in its infancy. A study of these volatiles would prove invaluable to understanding the origins of the Solar System.

Inherent in the strategy is the long-range vision of sending humans to work and live on Mars. If we can learn to abide in a lunar environment, we should be able to deal with the harsh conditions on the Red Planet. As Carroll



Carroll's vision of a shuttle craft coming in to land at a Mars settlement.

describes, however, many in the aerospace industry ask: why waste time and money on the Moon when those resources could be better used for a mission to Mars? This debate will not be settled for some time.

What is not up for debate is the difficulty of establishing a long-term base on Mars. Just getting humans there will be a challenge. Travel times will be up to eight months, and by the time a crew lands the launch window to return home will practically be gone. Even if a crew stays for only a few weeks, they would have to wait another year and a half for the planets to

reach a favourable alignment for the journey back.

Planetary scientist Chris McKay of NASA's Ames Research Center in Moffett Field, California, thinks our approach should resemble the efforts made to live and work in Antarctica. "We've been [in Antarctica] for 50 years and built a station that's designed to last at least another 30. That's the kind of mentality I would like infused into the Moon programme... and Mars base."

Carroll writes passionately that missions to the Moon and Mars are like instinctual siren calls to humans. "It is something larger than ourselves, something for the generations to come." To deny these instincts, he argues, is to deny our history and to deny our humanity.

Having won the race to the Moon with *Apollo 11* in 1969, US public interest in pushing on to Mars quickly waned. *The Seventh Landing* demonstrates that it has never died,

however. Carroll's enthusiasm is infectious and will inspire readers who look back on the *Apollo* landings as a time when mankind really did make giant leaps towards a promising future. Maybe we will finish what we started 40 years ago and set a course for Mars, either directly, or by way of the Moon. After all, that was the idea in the first place.

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For more on *Apollo*, see www.nature.com/Apollo.

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APOLLO BOOKS

The anniversary of the first footstep on the Moon is being celebrated in an array of new books. Drawing on NASA's archive of oral histories, and declassified Central Intelligence Agency material on the space race, historian Craig Nelson tells in *Rocket Men* (Viking) the full story of the *Apollo* programme from the crews' training to the first moonwalkers' return as media stars.

In his straight-talking memoir *Magnificent Desolation* (Harmony), co-written with author Ken Abraham, Buzz Aldrin describes

the great journey. More than 600 million people watched Aldrin become the second man to set foot on the Moon. But on his return to Earth he spiralled into depression and alcoholism.

Other *Apollo* astronauts describe their lunar experiences in Andrew Chaikin's *Voices From the Moon* (Viking Studio) and select their favourite photographs from the mission in *Apollo: Through the Eyes of the Astronauts* (Abrams), edited by Robert Jacobs and others.

NASA's official history, *Apollo*



A shelf of testimonies from the men who walked the walk.

Expeditions to the Moon, edited by Edgar Cortright, is being reissued by Dover. It will include first-hand

accounts from those involved in all areas of the mission and a DVD with historic space footage.

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